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THE DISTRIBUTION AND STATUS IN SINGAPORE OF *RUBUS MOLUCCANUS* L. VAR. *ANGULOSUS* KALKMAN (ROSACEAE)

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INTRODUCTION

This paper seeks to document the status of *Rubus moluccanus* var. *angulosus* (Fig. 1) in Singapore. The genus *Rubus* belongs to the family Rosaceae and comprises of a few hundred species (Kalkman, 1993). Members of this genus are largely shrubs and are typically climbing, straggling or creeping, and rarely erect. The genus *Rubus* has a subcosmopolitan distribution, being neither temperate nor tropical but well-represented in America, Asia, and Europe. Out of the 50 or so species occurring in Malesia, only a single species; *Rubus moluccanus,* with its two varieties (var. *moluccanus* and var. *angulosus*), was recorded for Singapore (Keng, 1990; Chong et al., 2009).

Rubus moluccanus is a usually climbing or scrambling, rarely creeping shrub. The stems grow up to 6–10 m long, and are densely covered with hairs when young (Fig. 2). It gradually develops small prickles that are sparsely distributed as the plant matures. The leaves take on various forms, depending on the varieties. They range from ovate to broadly ovate, 6–20 cm by 4–15 cm, are variously lobed, with a cordate to subtruncate base, with serrate margins, and acute to acuminate apex. The adaxial surface of the leaf blade is hairy, especially along the veins, while the abaxial surface is covered with a densely woven felt of long, thin, curly hairs. The inflorescence is a terminal, leafy, branched raceme

Fig. 1. *Rubus moluccanus* var. *angulosus* creeping over the forest floor. (Photograph by: Alvin Francis Lok Siew Loon).

Fig. 2. Young shoot that is densely covered in white hairs. (Photograph by: Alvin Francis Lok Siew Loon).

Fig. 3. Inflorescence of flower buds. (Photograph by: Alvin Francis Lok Siew Loon).

Fig. 4. Flower just after abscission of petals. (Photograph by: Alvin Francis Lok Siew Loon).

Fig. 5. Aggregate fruits. (Photograph by: Alvin Francis Lok Siew Loon).

Fig. 6. Leaf showing distinctly overlapping basal lobes (arrowed). (Photograph by: Alvin Francis Lok Siew Loon).

(Fig. 3), about 20 cm long, bearing up to 10 white (sometimes pink, red or yellow in different varieties) bisexual flowers (Fig. 4). After fertilisation, the flowers develop into red, fleshy, globular aggregate fruits (Fig. 5) that are eaten and dispersed by birds and terrestrial mammals. Based on differences in leaf and floral morphology, five varieties of *Rubus moluccanus* are recognised—var. *angulosus*, var. *discolor*, var. *moluccanus*, var. *obtusangulus*, and var. *trilobus* (Kalkman, 1984; Bean, 1997).

Fig. 7. Habitat at Temenggong Road. (Photograph by: Alvin Francis Lok Siew Loon).

Fig. 8. Slope for proposed stabilisation works along Temenggong Road threatening a population of *Rubus moluccanus* var. *angulosus*. Inset: signage announcing impending slope stabilisation work. (Photograph by: Alvin Francis Lok Siew Loon).

Rubus moluccanus var. *angulosus* is distinguished from other varieties in that the young twigs, nerves, and veins on the lower leaf blade surface bear long, straight hairs that are semi-appressed to patent, over a woolly felt of thin, curly hairs. Leaves are distinctly 3–5(sometimes 7)-lobed with the main lobes usually shallowly lobed again. The apical lobe is large, about half of the total length of the leaf or slightly smaller. The leaf base is cordate, with margins of the basal lobes distinctly overlapping or at least touching each other (Fig. 6). Leaf nervation is pedate, with seven main nerves running through.

PAST AND PRESENT RECORDS

Two varieties of *Rubus moluccanus* have been recorded from Singapore―var. *angulosus*, and var. *moluccanus* (Keng, 1990; Chong et al., 2009). *Rubus moluccanus* var. *moluccanus* is said to be still extant but vulnerable, while *Rubus moluccanus* var. *anugulosus* is extinct from the wild (Tan et al., 2008). However, from herbarium specimen records, most material were later determined as that of var. *angulosus* by C. Kalkman (Table 1).

Table 1. Previous Singapore collections of *Rubus moluccanus* var. *angulosus* deposited in the Herbarium, Singapore Botanic Gardens (SING, with bar code no.).

S/No.	Accession/Bar Code No.	Collector	Collector's No.	Date	Locality
1.	0025275	Ridley, H. N.	s.n.	1892	Chan Chu Kang
2.	0025274	Hullett, R. W.	309	May 1884	
3.	0025276	Ridley, H. N.	s.n.	10 Jan.1889	Jurong
4.	0025277	Ridley, H. N.	s.n.	12 Dec.1889	Tanglin
5.	0025273	Burkill, I. H.	290	17 May 1914	Holland Road
6.	0036811	Tang, E.	2167	13 Jan.1933	Changi Road, 6th mile
7.	0025286	Sinclair, J.	37800	15 Sep.1948	Bukit Timah
8.	0025282	Cantley, N.	s.n.	5 Jan.1973	
9.	0025285	Mohd Shah; Ali Ibrahim	4151	3 Dec.1981	
10.	0025284	Kiah, S.	715	30 Aug.1984	
11.	0025281	Tang, E.; Sidek, K.	782	10 Jul.1995	Nee Soon
12.	0025283	Cantley, N.	2898	–	

Since the plant has been collected in the wild for the past two decades, its erroneous nationally extinct status as proposed by Tan (2008), and Chong et al. (2009), were probably owed to misidentification of the herbarium specimens. Based on current surveys, wild populations of *Rubus moluccanus* var. *angulosus* are estimated at 250–1,000 mature individuals. This species is restricted to beach and inland forests, particularly at forest edges and in secondary forests where light is more available. These habitats have however become dominated by many species of exotic flora that are now considered naturalised here in Singapore. Based on these considerations, the status of this plant should therefore be reclassified as "nationally vulnerable" since and there is some evidence of reduction in habitat range (Davison, 2008).

On 8 Jan.2010, WFA and AFSLL encountered *Rubus moluccanus* var. *angulosus* in a thin strip of degraded coastal forest along Temenggong Road (Fig. 7). The plants were found creeping on the forest floor (Fig. 1), or growing over other shrubs. The lengths of the stems were between 1–2.5 m long and growing beside the critically endangered native plant, *Leea angulata.* Unfortunately, a signboard put up by the Singapore Land Authority along the road had announced stabilisation works (Fig. 8) to be carried out on the slopes where populations of the two species were found growing.

CONCLUSIONS

While it is estimated that Singapore has loss 30% of its native flora to landscape changes and urban development (Chong et al., 2009), the occasional but regular rediscovery of deemed nationally extinct plants suggests hope for Singapore's native biodiversity. The discovery of *Rubus moluccanus* var. *angulosus* growing alongside the critically endangered *Leea angulata* on a small, thin stretch of unprotected degraded coastal forest along Temenggong Road, illustrates the potential of remnant forest patches in the urban areas of Singapore as refuges for threatened native species.

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